ELEMENT
Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING

Proposed Development of the Zandhoogte Landgoed on Zandhoogte 139, Tergniet, Mossel Bay

ELECTRICAL SERVICES INVESTIGATION REPORT

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1 INTRODUCTION

Element Consulting Engineers has been appointed by Ideal Trading 301 (Pty) Ltd for the rendering of the complete multi-disciplinary package of consulting engineering services for the proposed development of the Zandhoogte Landgoed in Tergniet, Mossel Bay.

The proposed development of the estate is on portions 1 and 2 of the farm Zandhoogte 139, Tergniet, Mossel Bay and approximates an area of 10.2ha. The land is located in Tergniet, approximately 5km west of Great Brak River in the Mossel Bay Municipal area and possesses excellent ocean views from the majority of the site.

The proposed development envisages a retirement estate consisting of approximately 161 townhouse apartments and 48 flats.

This report covers the results from the investigation and the discussions held with the Local Supply Authorities in this regard. The report also considers preliminary design philosophies with regard to the medium voltage (MV) and low voltage (LV) reticulation requirements for the overall development for the purpose of compiling a Budget Cost Estimate.

All of the solutions provided are based on preliminary discussions and are subject to final approval by the Mossel Bay Municipality's Electrical Department.

The aim of this Report is the following:

i. Investigate alternatives for providing bulk electrical services to the development site;
ii. High level calculation of electrical load requirements;
iii. Determine available capacity on the supply network for this development;
iv. Identify limitations with regard to capacity available;
v. Identify specific requirements from the Municipality (Supply Authority);
vi. Compilation of a cost estimate;
vii. Conclusions and recommendations on options investigated;

2 BULK ELECTRICAL SUPPLY

The diagram below depicts an extract from the municipality's master plan drawing for the MV reticulation in the area of the proposed development.

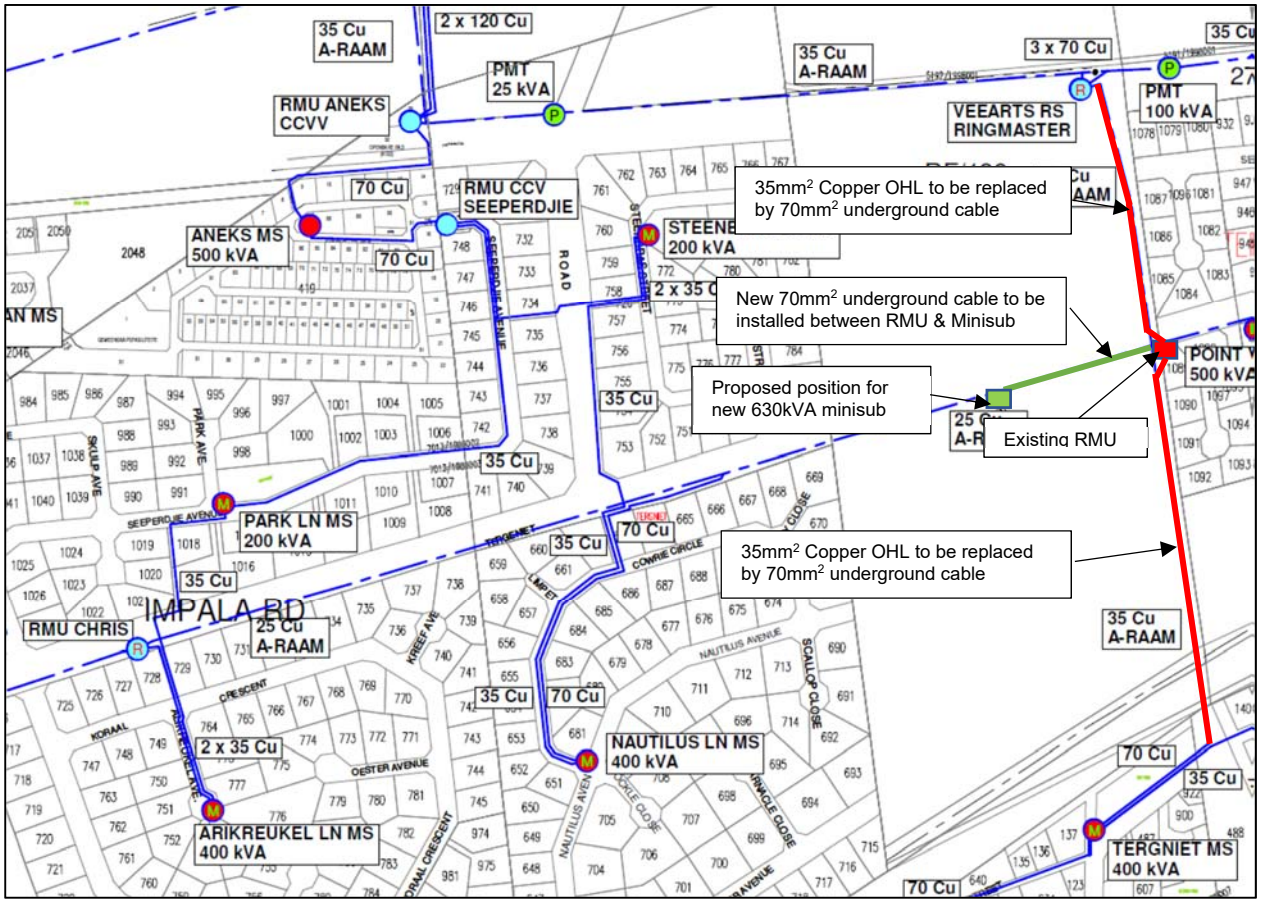

Figure 1: Existing Electrical MV Infrastructure

Investigations on site and discussions with the Mossel Bay Municipality indicated that the best possible solution for the supply to the proposed development, would be from the existing 35mm^2 copper overhead line, which runs along the eastern side of the development. In order to further strengthen the supply to the new Zandhoogte development, it would be required to replace the existing 35mm^2 copper overhead line with a new 70mm^2 copper, underground cable (to be installed in the same servitude as the existing overhead line structures). Figure 1 indicates the position of the existing overhead line.

Figure 1: Exiting 11kV Overhead Line

As part of the replacement of the overhead line with underground cable, a new section of 70mm^2, Copper, PILC cable will be installed (underground) along Impala Road via the existing RMU (shown in Figure 2 below) to the proposed position of the new 630kVA minisub, from which the new Zandhoogte development will be supplied. The position of this minisub will be on the southern side of Impala Road, on the municipal pavement, as close as possible to the main entrances of the sections of the development.

Figure 2: Existing Ring Main Unit

A bulk LV metering point will be supplied at the new 630kVA minisub. It is important to note that the minisub will not be installed inside the development, as this will become municipal property and they require easy and direct access.

3 SPECIFIC ELECTRICAL REQUIREMENTS

3.1 Load Forecast

The following design criteria is used for calculation of consumption for the development:

- Load criteria:
  - Single residential erven – 4.0 kVA
  - Town Houses (<120 m^2 each) – 3.5 kVA
  - Flats (<90m^2 each) – 3.0 kVA

- Diversity factor – 0.8

The calculation of the diversified load of the development of 161 town houses and 48 flats, in line with the above design criteria, is calculated as approximately 630kVA.

3.2 Energy Efficient Designs

A number of energy saving and green building design measures are proposed to be incorporated into this development. These measures are being investigated and will be finalized during the detail design phase and will be communicated to the Client and the Mossel Bay Municipality for final approval.

3.3 Internal Low Voltage Electrical Reticulation

Decorative and energy saving street lighting will be provided for the Estate and will be supplied from the new 630kVA minisub.

An internal low voltage reticulation network will be provided from the new minisub to standard street-front kiosks (9-way) for the town houses and all cabling will be installed underground. Metering will be in the form of Pre-Paid Metering and will comply with the Automated Metering Requirements (AMR) of the Mossel Bay Municipality.

All design parameters for internal reticulation will be in accordance with the standard specifications of the Mossel Bay Municipality.

4 PRELIMINARY COST ESTIMATES

Table 4-1: Preliminary Cost Estimate: Bulk Electrical Infrastructure

Preliminary Cost Estimate: Bulk Electrical Infrastructure	
Description	**Amount**
Replacement of 11kV Overhead Line with 70mm^2 copper underground cable (740m)	R 750 000
Supply and Installation of New 630kVA Minisub	R655 000
Sub Total	**R 1 405 000**
P&G's, contingencies & escalation	R 140 500
Sub-total	**R 1 545 500**
VAT (15%)	R 231 825
Total	**R 1 777 325**

Table 4-2: Preliminary Cost Estimate: Internal Electrical Infrastructure

Preliminary Cost Estimate: Internal Electrical Infrastructure	
Description	**Amount**
LV Reticulation	R 1 535 125
Service Connections	R 1 347 085
Telkom	R 358 085
Streetlighting	R 685 715
Other & general	R 423 990
Sub Total	**R 4 350 000**
P&G's, contingencies & escalation	R 435 000
Sub-total	**R 4 785 000**
VAT (15%)	R 717 750
Total	**R 5 502 750**

5 CONCLUSIONS AND RECOMMENDATIONS

Sufficient capacity is available on the existing 11kV reticulation network to supply the estimated load of 630kVA to the proposed development. The existing 470m section of 35mm^2 overhead line between the Veearts RMU and the Tergniet MS will have to be replaced with 70mm^2 underground copper cable.

A new 630kVA minisub will have to be provided on the boundary of the development, which will be supplied from the Impala Street RMU via a new section of 70mm^2 underground cable. A bulk LV metering point will be provided at the minisub, from where the reticulation of an 400V network into the development will be supplied. The cost of these bulk infrastructure upgrades will be discussed with the municipality in terms of deductions from capital contributions.

The entire design of the electrical network will be such that it complies with the standards and specifications of the Mossel Bay Municipality.